

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

Amendments to the Claims:

- This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently amended): An apparatus for depositing a ceramic coating on a surface of a component, the apparatus comprising:

a single evaporation source containing multiple different oxide compounds, at least one of the oxide compounds having a vapor pressure that is higher than the remaining oxide compounds; ~~compounds, wherein the at least one oxide compound is ceria;~~

means for introducing the evaporation source into a coating chamber;
means for suspending the component near the evaporation source;
means for projecting a high-energy beam on the evaporation source to melt and form a vapor cloud having a composition comprising the oxide compounds of the evaporation source;

means for determining a first time period during which the composition of the vapor cloud is such that the relative amount of the at least

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

one oxide compound in the vapor cloud is greater than the relative amount of the at least one oxide compound in the evaporation source and for determining a second time period that immediately follows the first time period and during which the composition of the vapor cloud is such that the relative amount of the at least one oxide compound in the vapor cloud is approximately equal to the relative amount of the at least one oxide compound in the evaporation source;

means for preventing the vapor cloud from contacting and condensing on the component during the first time period; and an initial phase in which the composition of the vapor cloud is such that the relative amount of the at least one oxide compound in the vapor cloud is greater than the relative amount of the at least one oxide compound in the evaporation source; and

means responsive to changes in the composition of the vapor cloud for removing the preventing means at the end of the first time period to allow the vapor cloud to contact and condense on the component to form the coating, coating during a subsequent phase in which the composition of the vapor cloud has changed so that the relative amount of the at least one oxide compound in the vapor cloud is approximately equal to the relative amount of the at least one oxide compound in the evaporation source.

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

Claim 2 (Original): An apparatus according to claim 1, wherein the preventing means is a barrier positioned between the component and the evaporation source, and the removing means is operable to remove the barrier from between the component and the evaporation source.

Claims 3-5 (Canceled)

Claim 6 (Original): An apparatus according to claim 1, wherein the evaporation source consists essentially of yttria, zirconia and the at least one oxide compound.

Claim 7 (Canceled)

Claim 8 (Original): An apparatus according to claim 1, wherein the evaporation source contains about 10 to about 20 weight percent ceria, the balance essentially zirconia stabilized by about 3 to about 8 weight percent yttria.

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

Claim 9 (Currently amended): An EBPVD apparatus for depositing a ceramic coating on a surface of a component, the apparatus comprising:

a single ingot containing yttria-stabilized zirconia and at least one oxide compound having a vapor pressure that is at least an order of magnitude higher than yttria and zirconia;

means for introducing the ingot into a coating chamber;

means for suspending the component near the ingot; evaporation source;

means for projecting an electron beam on the ingot to melt and form a vapor cloud containing ions of yttria, zirconia and the oxide compound;

means for determining a first time period in which the composition of the vapor cloud is such that the relative amount of the at least one oxide compound in the vapor cloud is greater than the relative amount of the at least one oxide compound in the ingot and for determining a second time period that immediately follows the first time period and in which the composition of the vapor cloud is such that the relative amount of the at least one oxide compound in the vapor cloud is approximately equal to the relative amount of the at least one oxide compound in the ingot;

a barrier operable to be positioned between the ingot and the

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

component to prevent the vapor cloud from contacting and condensing on the component during the first time period; and - an initial phase in which the relative amount of the oxide compound in the vapor cloud is greater than the relative amount of the oxide compound in the ingot; and

means for removing the barrier at the end of the first time period to allow the vapor cloud to contact and condense on the component to form the coating. - coating during a subsequent phase in which the relative amount of the oxide compound in the vapor cloud is approximately equal to the relative amount of the oxide compound in the ingot.

Claim 10 (Previously presented): An EBPVD apparatus according to claim 9, wherein the at least one oxide compound is selected from the group consisting of ceria, magnesia, strontia, barium oxide, lanthana, neodymia, dysprosia, and ytterbia.

Claim 11 (Previously presented): An EBPVD apparatus according to claim 10, wherein the ingot consists essentially of yttria, zirconia, and the at least one oxide compound.

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

Claim 12 (Previously presented): An EBPVD apparatus according to claim 10, wherein the ingot consists of yttria, zirconia, and the at least one oxide compound.

Claim 13 (Previously presented): An EBPVD apparatus according to claim 12, wherein the at least one oxide compound is ceria.

Claim 14 (Previously presented): An EBPVD apparatus according to claim 9, wherein the ingot consists of yttria, zirconia, and the at least one oxide compound.

Claim 15 (Previously presented): An EBPVD apparatus according to claim 9, wherein the ingot contains about 10 to about 20 weight percent ceria, the balance essentially zirconia stabilized by about 3 to about 8 weight percent yttria.

Claim 16 (Currently amended): An EBPVD apparatus according to claim 9, wherein the removing means comprises programmable means for automatically removing the barrier following the first time period. initial phase.

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

Claim 17 (Previously presented): An EBPVD apparatus according to claim 16, wherein the programmable means comprises means for sensing the chemistry of the vapor cloud.

Claim 18 (Currently amended): An EBPVD apparatus according to claim 9, wherein the removing means is operable to reposition the barrier between the ingot and the component following the second time period ~~subsequent phase~~ and during a subsequent time period ~~second subsequent phase~~ in which a remaining portion of the ingot is relatively rich in yttria-stabilized zirconia.

Claim 19 (Currently amended): An apparatus according to claim 1, wherein the removing means comprises programmable means for automatically removing the preventing means following the first time period, ~~initial phase~~, and the programmable means comprises means for sensing the composition of the vapor cloud.

Claim 20 (Currently amended): An apparatus according to claim 1, wherein the removing means is operable to position the preventing means

Application No. 10/709,668
Docket No. 13DV-14039-3
Amendment dated February 5, 2007
Reply to Office Action of November 3, 2006

between the evaporation source and the component following the second time period ~~subsequent phase~~ and during a subsequent time period ~~second subsequent phase~~ in which a remaining portion of the evaporation source is relatively rich in the remaining oxide compounds.